

Remarks


This preliminary amendment is filed for the purpose of placing the application into standard U.S. format and to correct any grammatical errors. Claims 3-4, 6-7 and 10-12 have been amended and claims 13 - 20 have been added. Consideration and allowance of the claims is earnestly solicited.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "Version with markings to show changes made."

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Specification:

Paragraph beginning at page 1, line 4 has been amended as follows:

The object of [this] the present invention is directed to a method and device for dispersing pulp, especially pulp containing waste paper, that also contains solid material and a liquid phase in which method ground pulp mass is fed between the blade surfaces of a dispersing device that are brought in a rotating movement in relation to one another. [An object of the invention is also a dispersing device for applying the aforementioned method].

Paragraph beginning at page 1, line 10 has been amended as follows:

Pulp is treated in a dispersing device where the impurities of the pulp are separated from the fibers that are nevertheless not damaged in the treatment. This may be accomplished with the aid of mutually opposed blade equipped blade surfaces of the dispersing device [of which] where one blade surface [surfaces one] along [with] its base (stator) is fixed and the other blade surface along [with] its base (rotor) is rotating in relation to the other blade surface.

The blades and the narrow openings between them cause the pulp to move back and forth in the dispersing device, whereby separation of impurities from the fibers is accomplished. The purpose of dispersing is usually mechanical release of impurities from the fibers and simultaneously the grinding of impurities into smaller particles without nevertheless negatively affecting the properties of the fibers.

Paragraph beginning at page 1, line 22 has been amended as follows:

A dispersing device is especially well suited for treatment of pulp mass containing waste paper that contains ink particles or impurities such as adhesives and melt or fusion coatings. A method and dispersing device intended to [treatment of] treat this kind of pulp is presented in Patent Publication SE 502906. In the publication there is presented a grinding element
5 that consists of two mutually opposed grinding disks that are equipped with elevated indents. The inclined elevated patterns are arranged radially on the disks.

Paragraph beginning at page 1, line 30 has been amended as follows:

In addition to the planar dispersing devices even cone-shaped dispersing devices may be used. However, the problem with the conical dispersing devices is the small amount of mass transferring power allowed by them. Therefore when the pressure in the outlet chamber is high, that is, in the openings between the indents, the thrust is high, and adjusting the working faces becomes more difficult and the load of the dispersing device increases. The dispersing device may even become clogged, whereby the process is interrupted. This problem is avoided by using the inventive method.

Paragraph beginning at page 2, line 18 has been amended as follows:

In the method according to the invention the function of the blade surfaces of the dispersing device may be adjusted and regulated by decreasing the pressure in the outlet area of the dispersing device, that is the outlet pressure of the device. The outlet pressure of the dispersing device may be adjusted lower than the pressure in the outlet chamber of the
20 dispersing device by connecting a running wheel onto the rotor of the dispersed device. It is possible to decrease the outlet pressure to such a low value that the pressure at the end of the

blade area is lower than in the beginning of the blade area, [where by] whereby suction is created towards the end area, whereby problems arising due to the low transferring power of the traditional cone-shaped dispersing device are avoided. When using the inventive method the probability of clogging of the dispersing device is thus low. From the above it follows even that when using the inventive method the blades of the working surfaces of the dispersing device may be mounted at closer distances to one another, whereby the number of the blades is increased, whereby [further] the efficiency and productivity of the dispersing event are further improved.

Paragraph beginning at page 3, line 10 has been amended as follows:

The hydrostatic pressure for pumping of the pulp further to the next piping can be produced with the dispersing device or with [a] separate pumping equipment. Pumping in the outlet area of the dispersing device is accomplished with the aid of a running wheel situated at the outlet end of the blade opening and of which there may be several in the device. In the method, dispersing and pumping are thus realized in separate parts of the device, whereby they [don't] do not interfere with each other.

Paragraph beginning at page 3, line 17 has been amended as follows:

In the method according to the invention, pulp may [be] in addition be diluted at the outlet end of the blade opening with fluid introduced to the intake side of the running wheel. Thus the pulp may be diluted for the next process, if need [may] be, without a separate work stage. In the outlet chamber mixing is sufficient to cause efficient dilution without a separate

mixing means. The dilution fluid that may be pressurized or not, is introduced to the intake side of the running wheel through a feed channel of which there is at least one in the device.

Paragraph beginning at page 3, line 35 through page 4, line 6 has been amended as follows:

5 As stated above, according to the invention a conical dispersing device is used as dispersing equipment, the advantage of which is a wide working area. Hereby the outer cone preferably acts as a stator and the inner cone preferably acts as a rotor, onto which is additionally fixed a running wheel. The running wheel is most suitably fixed onto the cone acting as a rotor such that it diverts the flow of mass away from the axis of the cone. The
10 advantage of a conical dispersing device in regard to a planar dispersing device lies in that the number of blades may be raised 50-150% in relation to a planar dispersing device, whereby the probability of the blade meeting an impurity increases considerably and the efficiency of the dispersing event is improved.

Paragraph beginning at page 4, line 8 has been amended as follows:

15 Further in addition to the above, the following advantages among others are realized by a conical dispersing device: in dispersing impurities higher efficiency than with a planar dispersing device is realized [by] if both are operated at the same [known] energy level; breaking of pulp fibers is reduced because energy is distributed on a greater number of blades, whereby a higher energy level than with a planar dispersing device may be used
20 without nevertheless damaging the fibers; the service life of the blades of the dispersing

device is increased because the working surface area is larger and hence the relation energy/blade lower.

Paragraph beginning at page 5, line 1 has been amended as follows:

[Fig. 1 presents an embodiment of the dispersing device according to the invention,]

5 Fig. 1 is a partial longitudinal section of the [aforementioned] dispersing device according to the invention,

Fig. 2 presents a partial scheme of the structure and flow channels of the running wheel of the dispersing device presented in Fig. 1. Fig. 2 shows in addition the principle of the flow channels of the running wheel. The partial scheme is a cross section of the plane marked AA in Fig. 1, and

Fig. 3 presents the structure of the blade surface of the dispersing device according to Fig. 1.

Paragraph beginning at page 5, line 35 through page 6, line 4 has been amended as follows:

[In] Fig. 2 [is presented] presents a partial scheme of the structure of the running wheel 7 and of the flow channels 8 as well as the principle of the flow channels 8 of the running wheel. The partial scheme is a cross section of the plane marked AA in Fig. 1. The running wheel 7 has flow channels 8 that protrude axially outwards and are outlined by [organs] dashed lines 12. The flow of pulp 13 is away from the axis of the running wheel 7 in a direction opposite to the direction of rotation 14 of the running wheel 7. The running wheel 7 is mounted on the rotor in such a way that the direction of the flow of mass 13 changes in relation to the axis of the cone.

Paragraph beginning at page 6, line 15 has been amended as follows:

To [the one] a person skilled in the art it is obvious that the inventive method and the inventive device for dispersing pulp are not limited to the example presented above while they are based on the following claims.

5 In the Claims:

Claims 3-4, 6-7, and 10-12 have been amended.

1 3) (Amended) A method according to [one of the preceding claims] claim 2,
2 characterized in that said running wheel (7) is fixed on the cone acting as a rotor in such a
way that it diverts the flow of mass away from the axis of the cone.

3 4) (Amended) A method according to [one of the preceding claims] claim 3,
2 characterized in that the dilution of pulp at the outlet end (6) of the blade opening (5) is
accomplished by fluid introduced to the intake side of the running wheel (7).

6 6) (Amended) A method according to [claim 4 or] claim 5, characterized in that
2 the density of the pulp is after dilution 4-12%.

1 7. (Amended) A method according to [one of the preceding claims] claim 6,
2 characterized in that the pulp containing waste paper is dispersed in order to release printing
3 ink and/or impurities from the fibers of the pulp.

1 10. (Amended) A dispersing device according to [claim 8 or] claim 9,
 2 characterized in that the conical surface is at a 10-75° angle to the axis of the cone,
 3 preferably at a 10-30° angle to the axis of the cone.

1 11. (Amended) A dispersing device according to [one of claims 8 -] claim 10,
 2 characterized in that the blades (4) are arranged on said conical surface such that they
 3 overlap.

1 12. (Amended) A dispersing device according to [any one of claims 8 -] claim 11,
 2 characterized in that the blade surfaces of the device consist of cylindrical surfaces and
 3 conical surfaces that are in extension to one another.

In the Abstract:

Paragraph beginning at page 9, line 1 has been amended as follows:

[57] Abstract of the Disclosure

[The object of the invention is a] A method and [a] device for dispersing pulp, especially
 5 pulp containing waste paper, [in which method] where ground pulp mass is fed between the
 blade surfaces (3) of a dispersing device that are brought in a rotating movement in relation
 to one another. The invention is characterized in that the dispersing event takes place in a

narrow opening (5) between the conical surfaces (3) at the outlet end (6) of which there is arranged a running wheel (7) acting as a pump by which the pulp is pumped out of the dispersing device by centrifugal force. The inner cone of the dispersing device may act as a rotor and the outer cone may act as a stator. In addition, the pulp may be diluted at the
5 outlet end of the blade opening (5) with fluid introduced to the intake side of the running wheel (7).